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ORIGINAL ARTICLES

Mortality related to Caesarean section in rural Matebeleland North Province, Zimbabwe

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Abstract

Objectives: To describe mortality related to Caesarean sections as well as factors associated with these deaths.
Design: Retrospective cross-sectional.
Setting: Seven district hospitals in Matebeleland North.
Main Outcome Measures: Proportion of Caesarean sections that resulted in maternal deaths, and the causes thereof.
Results: 1093 Caesarean sections were carried out over a 3 year period; 18 women (1.6%) died within 42 days of the operation, 15 of them within 24 hours. Haemorrhage was the major cause of death. A major association with adverse outcome was delayed intervention.
Conclusion: The decision to perform a CS should take into account local circumstances.
Symphysiotomy remains an alternative under the prevailing socio-economic climate. Tubal ligation at the time of a CS must be made available to women who have completed their family to prevent complications in successive pregnancies.

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Introduction

Maternal mortality ratio in low income countries is 100-500 times higher than in rich countries; compare the extremes: Zimbabwe with 1100 maternal deaths/100 000 live births and Sweden with 2/100 000.[1] Mortality rates related to caesarean section (CS) are in the same range, 0.5-2% (1:2001:50) in poor income countries and 0.01-0.02% (1:10 000-1:5 000)[2] in the richer parts of the world. Mortality is greater in women who have more than one CS compared to those with a first CS, because of increasing age and therefore higher prevalence of general medical conditions, as well higher incidence of complications such as ruptured uterus (risk 0.2-1.5% after low transverse incision) and placenta praevia or accreta (risks 1.1-3.0 and 5-10 times greater than in an unscarred uterus).[2] Compared to vaginal birth maternal mortality related to CS was shown to be 17 times higher in a medical audit in Midlands province in Zimbabwe.[3]

In 2000 Hannah *et al.* published the results of the Term Breech Trial in the Lancet.[4] In short: a planned CS should be the preferred mode of delivery for a breech presentation at term, because this would result in a significant reduction of perinatal mortality rate (PNMR) and serious foetal morbidity. The authors stated that this reduction was far less marked in countries with a high (>20/1000) PNMR than in countries with a low PNMR: reduction of 4.4% to 2.9% versus 5.7% to 0.4%, and that as many as 39 additional CS could be needed in countries with a high PNMR in order to avoid 1 dead or compromised baby against 7

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additional CS in countries with a low PNMR. Maternal complications in this study at least with the index delivery - were not significantly different between the CS and vaginal birth groups.

The Term Breech Trial has had far reaching consequences. In high income countries the majority of women with a term breech presentation are now delivered by CS. In for example the Netherlands the CS rate for term breeches which was around 45% in 1996 increased to 80% in 2001.[5] Also in Zimbabwe, in rural Matabeleland-North province, the results of the Term Breech Trial sparked off a lively discussion among medical officers about whether all term breeches should now be delivered by CS. In many district hospitals a policy was already in place (carried over from the central teaching hospitals) that a nullipara with a term breech presentation should undergo a CS.

The objectives of this cross-sectional retrospective study were to determine mortality after CS as well as possible factors associated with these deaths, in order to contribute to decision making about indications for CS in the province. In the same period the outcome of singleton breech presentations was studied, the results of which are reported elsewhere.[6]

Materials and Methods

Matabeleland-North has seven districts and a predominantly rural population of 815 000 (1999).[6] Seven (acting) district hospitals were included in the study. A large private mine hospital was excluded, as well as a mission hospital where no CS were performed. Delivery registers, admission books, hospital medical records, maternal mortality notification forms and monthly mortality reporting forms for the three year period 1998-2000 were scrutinized and the following information recorded on a checklist: numbers and place of deliveries, numbers of CS and their indications, maternal deaths, causes and circumstances of death and parity of the women who died.

A maternal death related to a CS was defined as a woman who died during, or within 42 days after, an abdominal operation to deliver a baby, including surgery for rupture of the uterus.

The circumstances in the different hospitals under which CS were carried out, were rather similar: the medical officers were young general doctors who had practised 15-30 CS in a central or training hospital before they started their career as a district doctor a few years earlier, with the exception of an experienced surgeon in one mission (acting district) hospital. Nurse-anaesthetists gave general anaesthesia. Some of them had attended a six months training course, others had been trained on the job. Staff turnover was high. Spinal anaesthesia was discouraged in this province. Intubation of the patients was part of routine management.

Data were entered and analysed with the use of EPI-INFO software.

Results

In the three year period 1998-2000 21902 deliveries were reported by the seven hospitals, about a quarter of all deliveries in the province. 1128 ended in a CS (5.2%, range between hospitals 2.1% to 9.8%) complicated by 18 deaths (1.6%, ranging from 0.5% to 3.8% between hospitals). Of 35 CS no further information could be obtained, except that they had not resulted in deaths, thus 1093 CS remained for analysis.

Of the 1093, 168 (15.4%) were elective CS, with 2 deaths (1.2%); the 925 (84.6%) emergency CS resulted in 16 deaths (1.7%). 432 (39.%) CS were in nulliparae (4 deaths, 0.9%) and 661 (60.5%) in multiparae (14 deaths, 2.1%), only one of whom had a parity higher than 4. Six of the 14 multiparae had a history of a previous CS: 2 women had a history of one and 4 women of two or more CS.

Table 1 shows the indications for CS in nulliparae and multiparae and associated deaths. Obstructed labour was the main reason for CS in nulliparae, in 57.4%. In multiparous women a history of 2 previous CS was in 30.9% the indication for CS and "1 previous CS with a complication" (such as twins, or pregnancy induced hypertension) or "failed trial of scar" in 25.0%, so that more than half of the CS in multiparae were related to a scar in the uterus. Breech presentations were the indication for CS in 12.0% of the nulliparae and 3.2% of the multiparae. Of the 11 women with a ruptured uterus, 6 died. Two were nulliparae; of the 9 multiparae 3 had undergone previous CS.

Haemorrhage ranks highest as direct cause of death (10/18; 5 were women with a previous CS) followed by anaesthetic accidents (3, of whom 1 woman with a previous CS) and sepsis (3). In two women the cause of death was not clear, but the diagnosis "cardiac arrest five hours after the CS" in one otherwise healthy woman makes again haemorrhage a likely cause. Fifteen women died within 24 hours after the operation.

In 12 of the 18 deaths failure of the staff to timely recognize a serious problem or to effectively deal with it contributed strongly to the woman's death. For example, too late recognition of failed intubation in two women, one of whom underwent an elective CS, or underestimation of severity of blood loss in two women with antepartum haemorrhage and thus delayed blood transfusion. Seven women died from haemorrhage during or shortly after the operation because the doctors failed to successfully repair the uterus.

Table I: Indications for Caesarean section in Nulliparae and Multiparae seven district hospitals rural Matebeleland North 1998-2000.

Indications for CS	Nulliparae				Multiparae				Total			
	CS		Deaths		CS		Deaths		CS		Deaths	
	n	%	n	%	n	%	n	%	n	%	n	%
Obstructive labour	248	54.7	2	0.8	87	3.2	3	3.4	335	30.6	5	1.5
Foetal distress	43	10.0			41	6.2	1	2.4	84	7.7	1	1.2
Placenta praevia/abruptio	16	3.7			50	7.6	3	6.0	66	6.0	3	4.5
1 previous CS plus complication					117	17.7	2	1.7	117	10.7	2	1.7
Failed trial of scar					48	7.3			48	4.4		
2 or more previous CS, no complications					204	30.9	1	0.5	204	8.7	1	0.5
Ruptured uterus	2	0.5	2	100	9	1.4	4	44.4	11	1.0	6	54.5
Breech presentation	52	12.0			21	3.2			73	6.7		
Pregnancy induced hypertension	22	5.1			13	2.0			35	3.2		
Abnormal presentation	10	2.3			23	3.5			33	3.0		
Cord prolapse	8	1.9			10	1.5			18	1.6		
Twin pregnancy	3	0.7			9	1.4			12	1.1		
Other	28	6.5			29	4.4			57	5.2		
Total	**432**	**100**	**4**	**0.9**	**661**	**100**	**14**	**2.1**	**1093**	**100**	**18**	**1.6**

Discussion

The results of this study show a high maternal mortality rate related to CS of 1.6% in district hospitals in rural Zimbabwe. This is somewhat higher than reported by Fenton *et al.* over the same period and a similar setting in Malawi, where 1.3% of the women died in the first 72 hours after the CS.[7] Van Roosmalen found 3.3% mortality in rural Tanzania in the period 1978-1984.[8]

Depending on the hospital in Matabeleland-North the risk of dying related to a CS may be 1:200 or 1:26. The indication for a CS determines to a large extent the outcome: mortality after a ruptured uterus was more than 50%, while no woman died after a CS for breech presentation. An important part of the difference between hospitals can be explained by differences in socio-economic circumstances in the district. In the more disadvantaged districts health facilities have fewer staff, who are often less well trained, and staff turnover is higher; few women plan to deliver in a health facility with the result that those who do end up in hospital are in more advanced labour and have more complications.

Since this study was done, socio-economic circumstances in Zimbabwe have worsened. More maternal deaths can be expected, but will probably go unreported, in women with a previous CS who decide to deliver at home. They are unable to afford transport to a hospital before or when complications occur, ambulances are becoming more and more unreliable and fuel unobtainable. In fact, even during the period under study two more maternal deaths were notified (not included) in women with a previous CS, most likely from a ruptured uterus. One woman died at home, the other in hospital before she could be taken to theatre.

Large differences were found between the district hospitals in their CS rates. This can be explained by the fact that some hospitals do not at all times have a resident medical officer. However, it is also a reflection of different policies and personal preferences and possibly experience of the medical officers. Higher CS rates did not result in lower perinatal mortality rates (PNMR), as might be expected. In fact, the mission hospital with a lower than average CS rate, but with a resident surgeon, had one of the lowest PNMR in the province.[9] In our view, doctors' commitment plays an important role here. Carrying out an (elective) CS requires less dedication than to closely monitor a woman in labour at night.

Conclusion

CS carried out under non-optimal conditions carry a very high risk of mortality, directly after the CS and again during future pregnancies and deliveries. Medical officers should be aware of these risks and base their decisions to perform a CS on rational protocols adapted to local circumstances. Medical audits comparing CS rates and associated maternal and perinatal mortality rates between hospitals can

contribute to the development of guidelines on absolute and relative indications for CS under the specific working conditions. The realisation that far too many women die after a CS, should make doctors much more reluctant to carry out a CS. The fewer first CS are done, the fewer women will need more complicated repeat CS or repairs of ruptured uteri.

In our opinion there is certainly no foundation to perform some 78 extra CS to save the life of two term babies in breech presentation, if this results in the death of one woman.

Symphysiotomy, frowned upon by many health workers as an obsolete intervention, is less risky compared to a CS under certain circumstances, such as a worsening socio-economic climate and declining staff levels. It may prepare the way not only for the present baby but also for future vaginal deliveries.[10]

The best way to prevent maternal deaths is to assist women who do not want to become pregnant to attain their reproductive goals. Contraceptives should be easily obtainable and tubal ligation offered to multiparous women who - in Zimbabwe - may not request this themselves. Women who likely have a completed family and need to undergo an (emergency) CS should always be offered tubal ligation. Research has shown that they are appreciative of being asked, knowing what decision to take.[11]

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References

1. State of the World Population 2006. United Nations Population Fund. http://www.unfpa.org/swp/2006/
2. Spaans W. Vaginal Birth after Caesarean Section in Zimbabwe and the Netherlands. PhD thesis (2004). University of Amsterdam. ISBN 9064643482.
3. De Muylder X. Maternal mortality audit in a Zimbabwean province. *Arch Gynecol Obstet* 1990;247:131-38.
4. Hannah ME, Hannah WJ, Hewson SA, Hodnett ED, SAigal S, Willan TR. Planned Caesarean section versus planned vaginal birth for breech presentation at term: a randomised multicentre trial. Term Breech Trial Collaborative Group. *Lancet* 2000;356:1375-83.
5. Roumen F, Bouckaert P. Primaire keizersnede bij stuitligging. *Medisch Contact* 57;19:753-6.
6. Van Eygen L, Rutgers R.A.K. Caesarean section as preferred mode of delivery in term breech presentations is not a realistic option in rural Zimbabwe (submitted for publication).
7. Fenton PM, Whitty CJM, Reynolds F. Caesarean section in Malawi: prospective study of early maternal and perinatal mortality. *BMJ* 2003;327:587-91.
8. Van Roosmalen J. Maternal health care in the south western highlands of Tanzania. PhD thesis (1988). Leiden Rijksuniversiteit.
9. Health Profiles Matebeleland-North 1998-2000. Ministry of Health and Child Welfare, Harare Zimbabwe.
10. Verkuyl DAA (2007). Think globally act locally: The case for symphysiotomy. *PLoS Med* 4(3): e71. doi:10.1371/journal.pmed.004007.
11. Verkuyl DAA. Sterilisation during unplanned caesarean sections for women likely to have a completed family should they be offered? *British J Obstet and Gynaecol* 2002;109:900-4.